Sources of contamination in the emission from the Local Bubble

Anjali Gupta
Massimiliano Galeazzi
Eugenio Ursino

Philadelphia, 22 April 2008

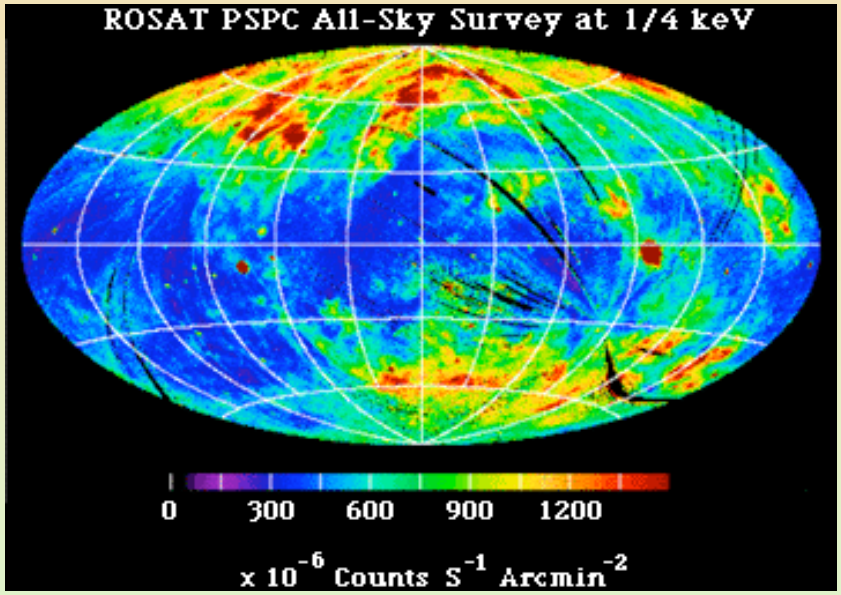
Outline

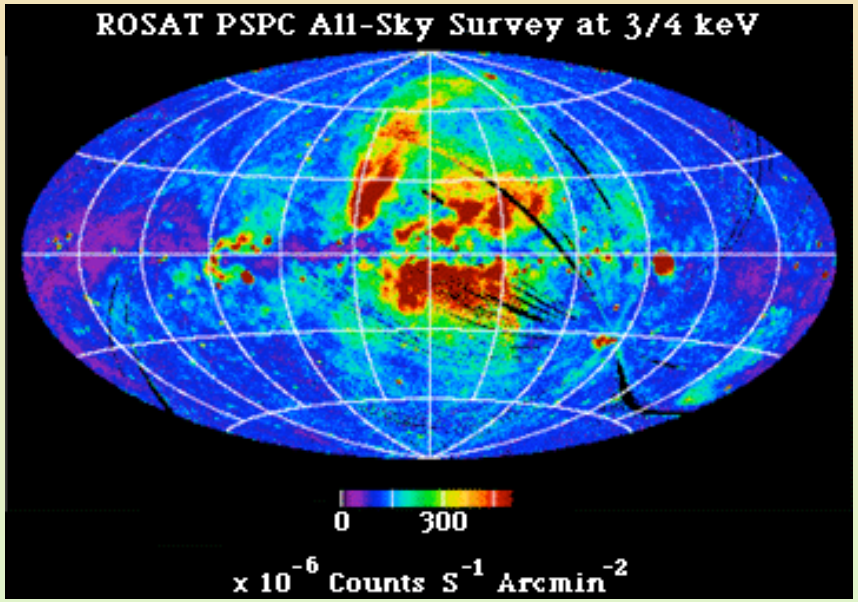
- The Diffuse X-ray background
- Unidentified point sources
  - Spectral Properties
- The Warm Hot Intergalactic Medium (WHIM)
  - Spectral properties
  - Angular properties

Philadelphia, 22 April 2008

UNIVERSITY OF Miami
X-RAY ASTROPHYSICS

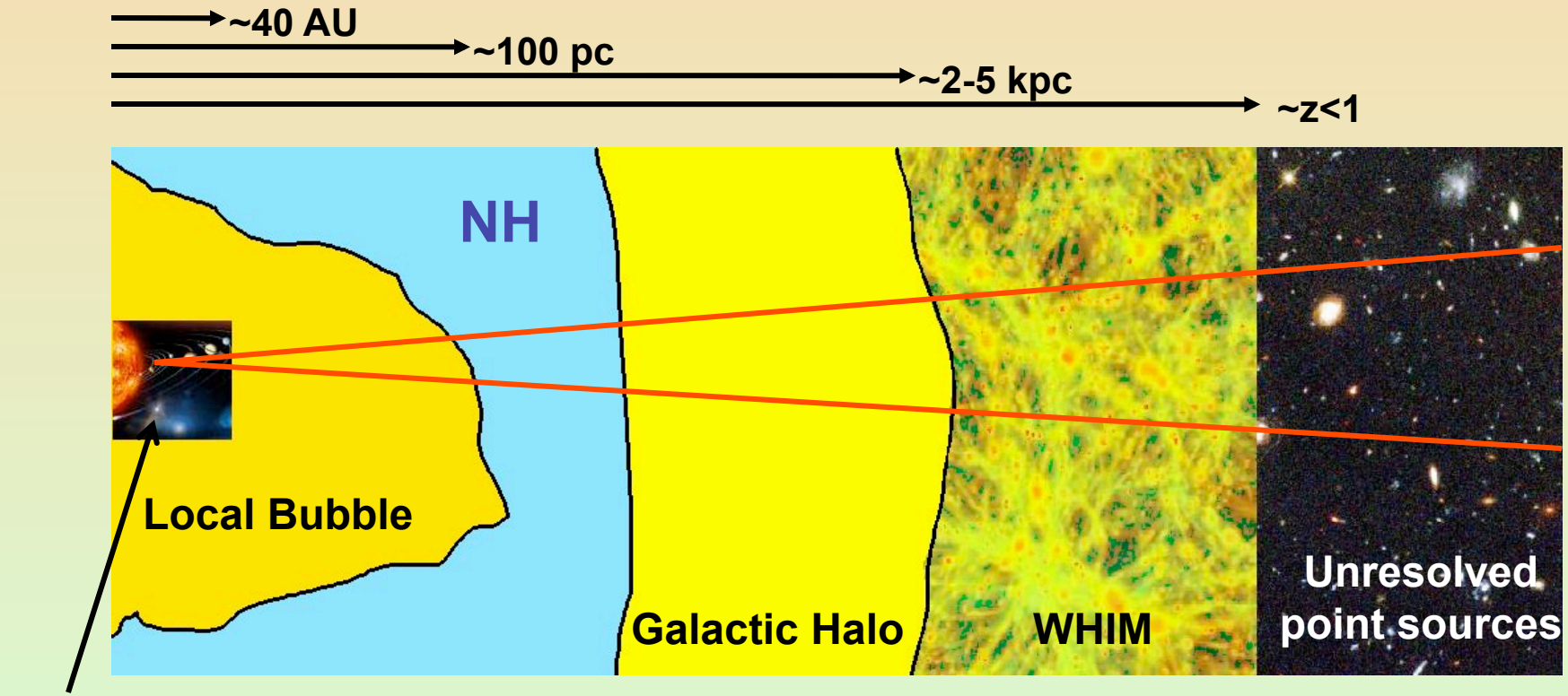
The Diffuse X-ray Background





Philadelphia, 22 April 2008

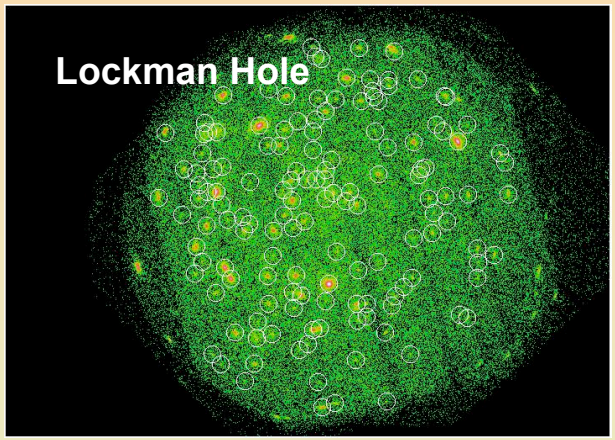
The Diffuse X-ray Background

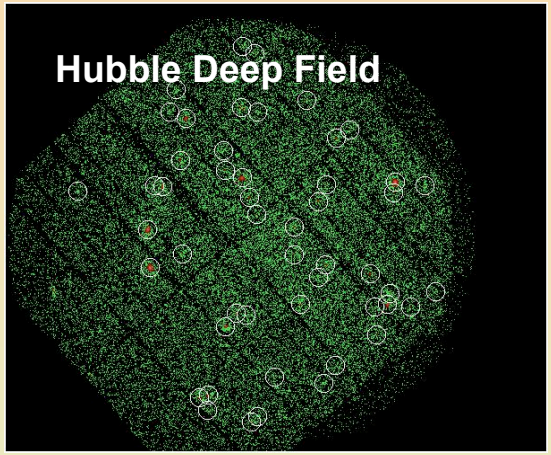


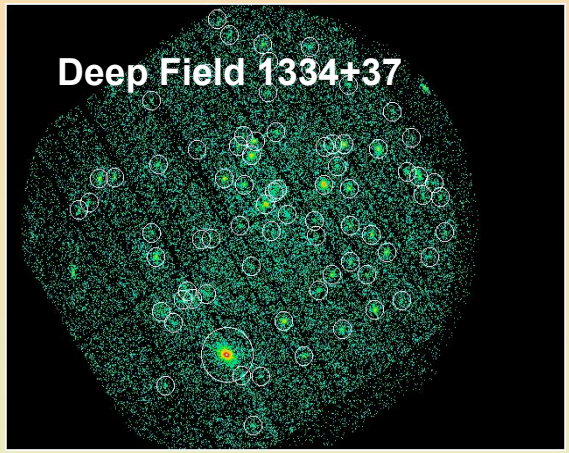
M. Galeazzi and A. Gupta (tomorrow)

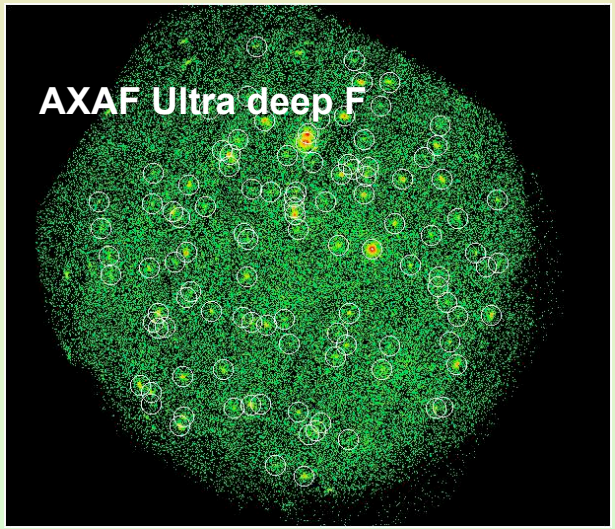
This Talk

Identification of the point sources

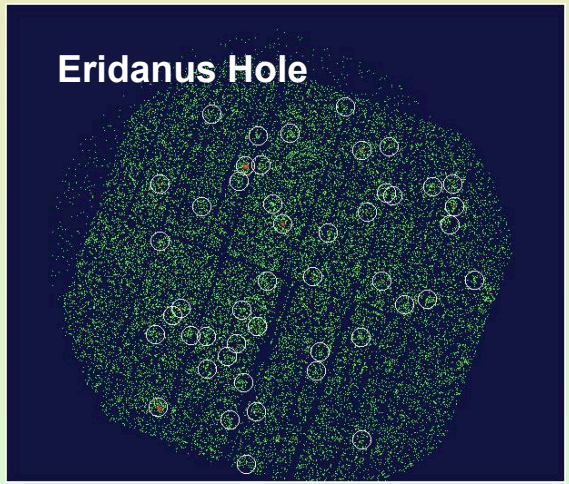






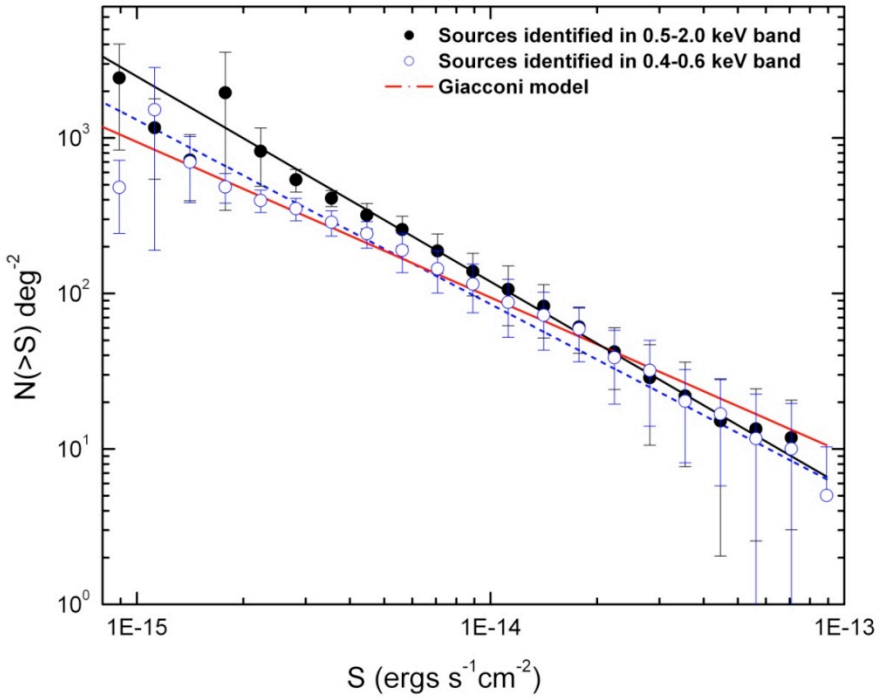


Mosaic images of the targets used in this investigation. The white circles represent the identified point sources.



Philadelphia, 22 April 2008

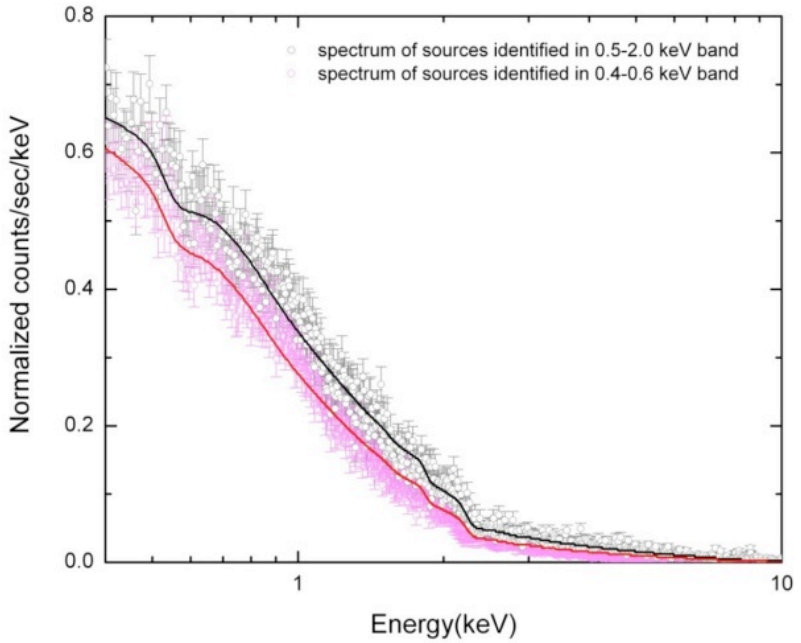
The logN-logS



The averaged logN-logS for all the targets used in our investigation

Philadelphia, 22 April 2008

Spectral Properties of the point sources

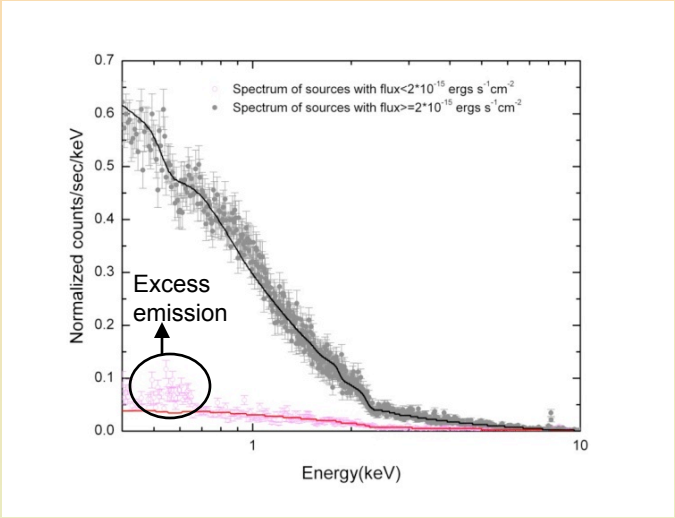


Average spectrum of all the sources detected in the 0.5-2.0 keV (black circles) and 0.4-0.6 keV (pink circles) bands.

The black and red curve represent the powerlaw fit with the photon index of 1.77±0.01 and 1.93±0.01, for the two bands respectively.

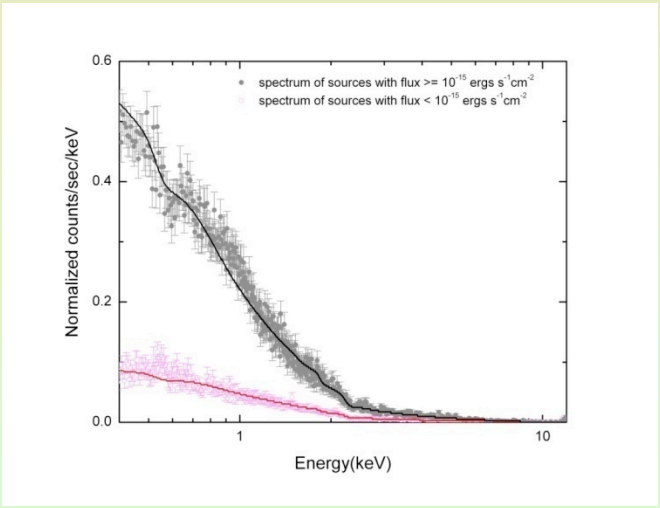
Philadelphia, 22 April 2008

Spectral Properties of the bright and the faint sources



Average spectrum of the bright (black) and faint (pink) sources detected in the 0.5-2.0 KeV.

The black and red curve represent the powerlaw fit with the photon index of 1.87±0.01 and 1.40±0.05, for the bright and faint sources respectively.

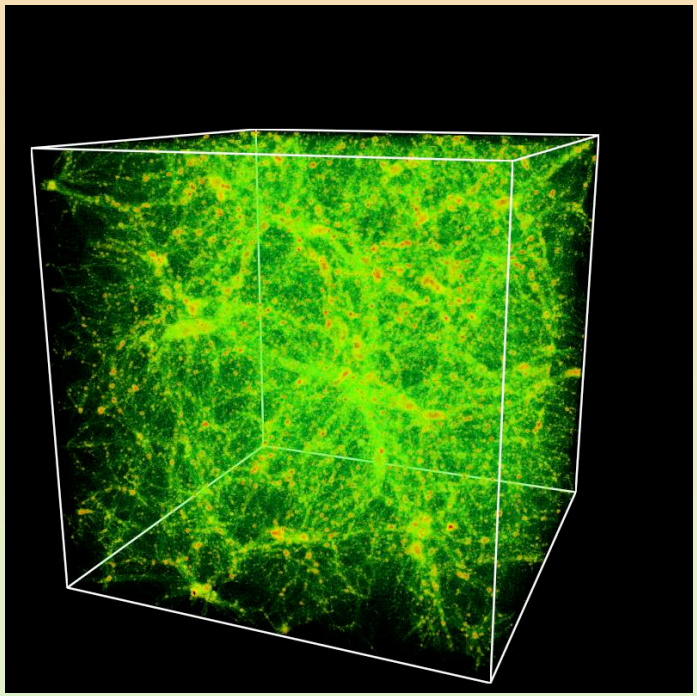


Average spectrum of the bright (black) and faint (pink) sources detected in the 0.4-0.6 KeV.

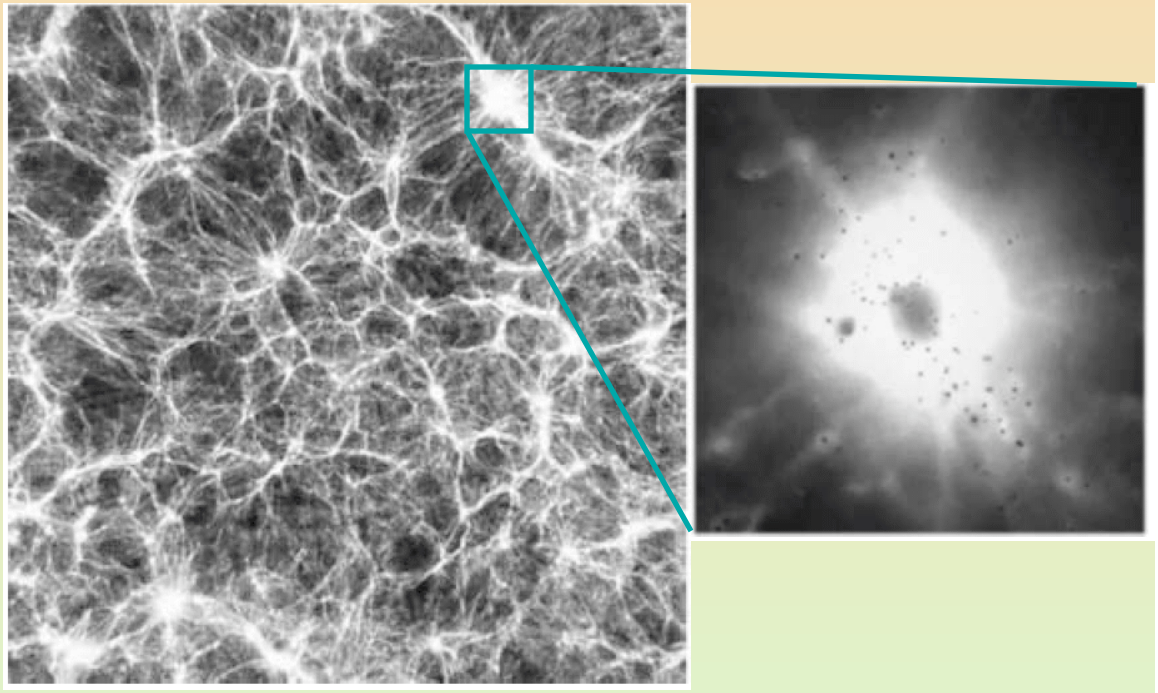
The black and red curve represent the powerlaw fit with the photon index of 2.05±0.01 and 1.69±0.04, for the bright and faint sources respectively.

Philadelphia, 22 April 2008

The Warm Hot Intergalactic Medium



Cen & Ostriker, 1999

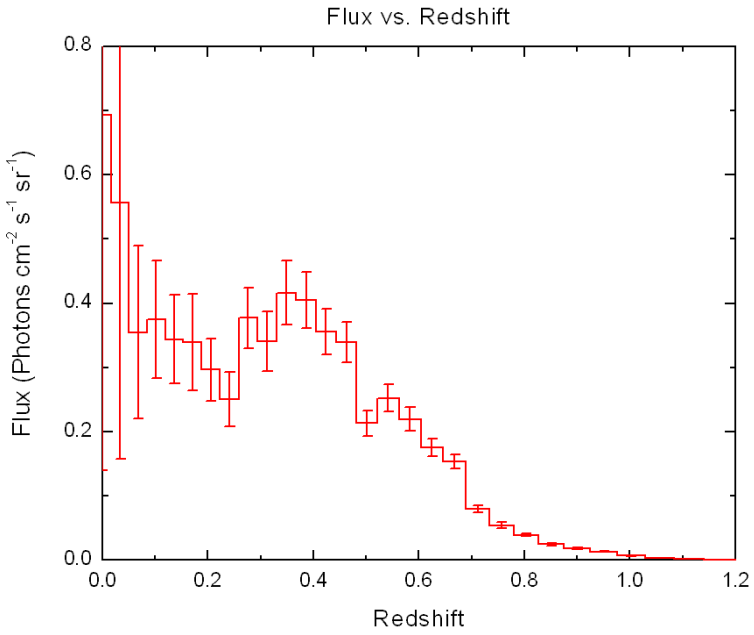


Borgani et al. 2004

Spatial distribution of the WHIM at z~0

Philadelphia, 22 April 2008

Flux vs. Redshift

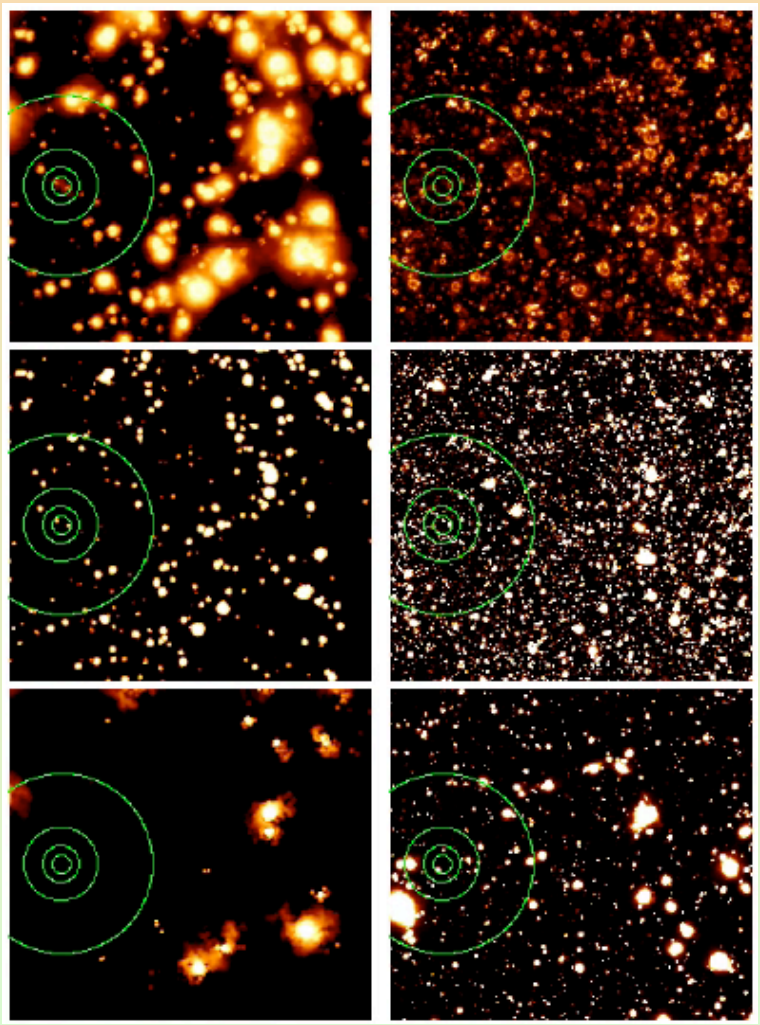


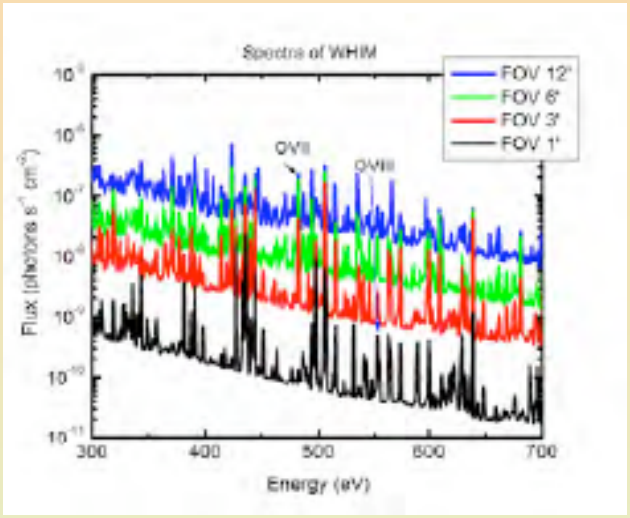
Expected average flux in the energy range 0.370-0.925 keV due to the WHIM as a function of red-shift.

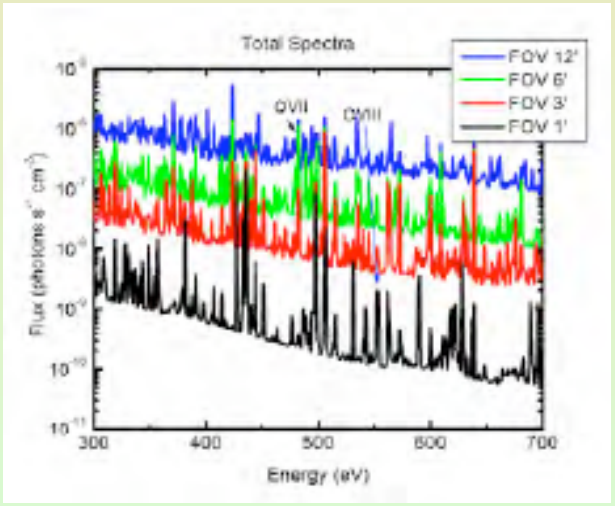
The total average flux due to the WHIM is about 5.7 photons/cm^2/s/sr

The total DXB flux is about 29.3 photons/cm^2/s/sr (derived using data from McCammon et al., 2002 - ApJ 576, 188).

Spectral Distribution of the WHIM

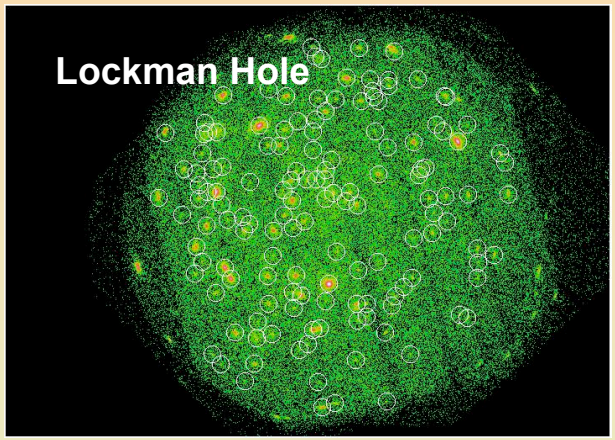


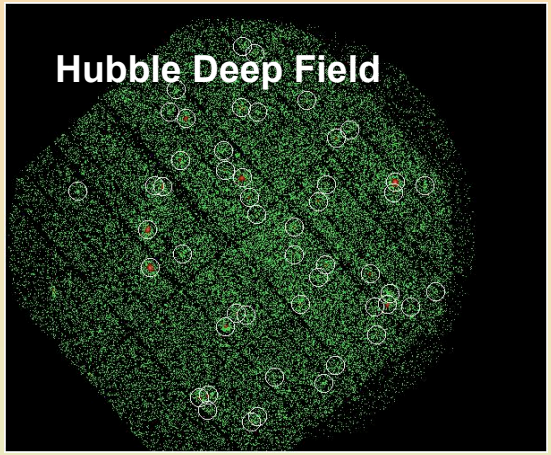


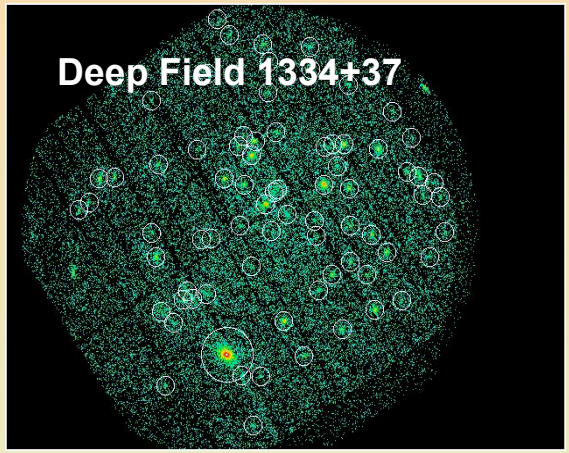


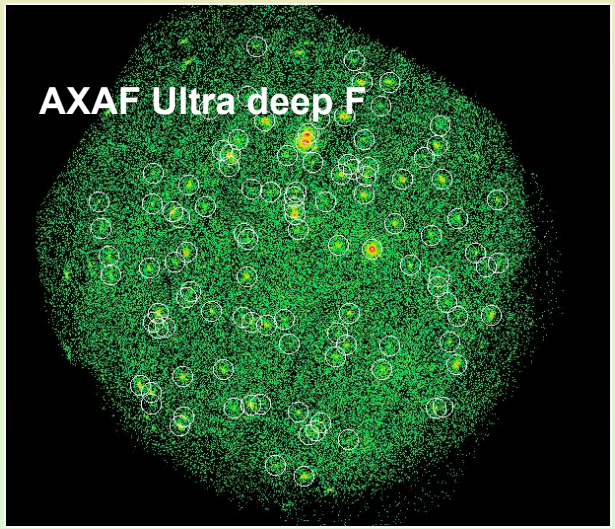
Philadelphia, 22 April 2008

WHIM signature in the Angular distribution of X-ray images

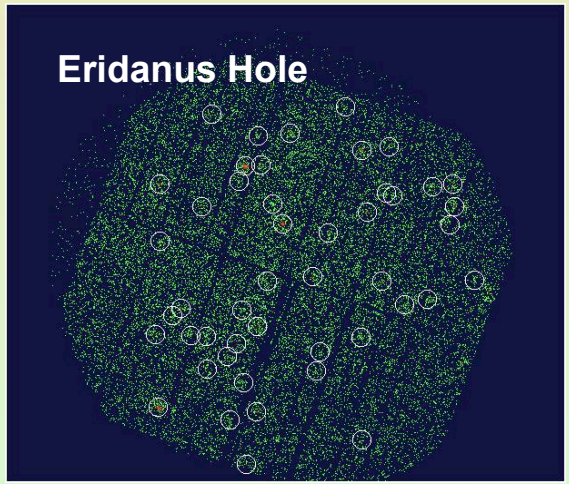






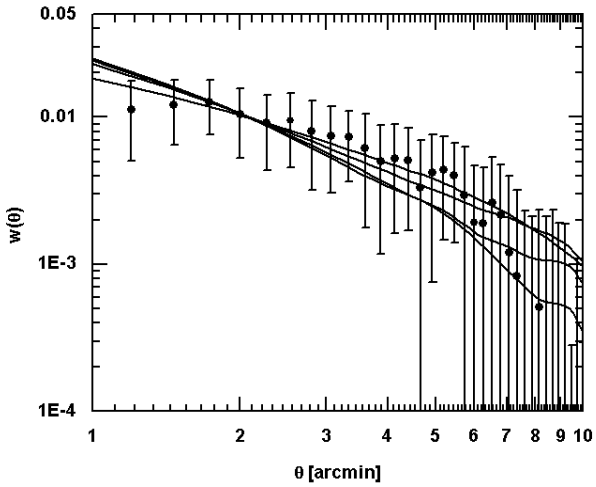


Mosaic images of the targets used in this investigation. The white circles represent the identified point sources.



Philadelphia, 22 April 2008

AngularAutocorrelation

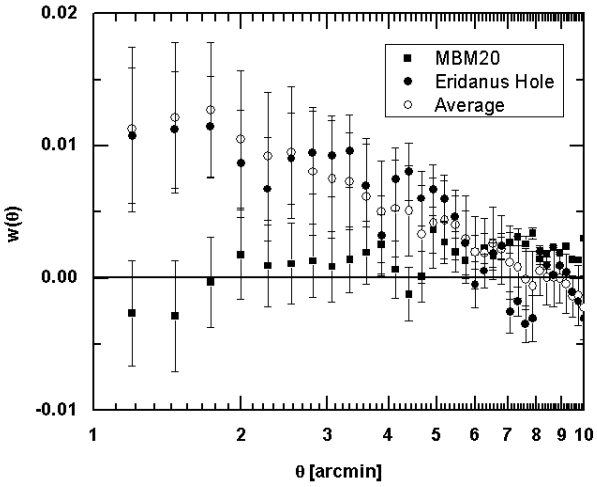


$$w(\theta) = \frac{\langle I(n)I(n')\rangle}{\langle I\rangle^2} - 1$$

The fraction of X-rays due to the WHIM in the energy band 0.4-0.6 keV is

18±5%

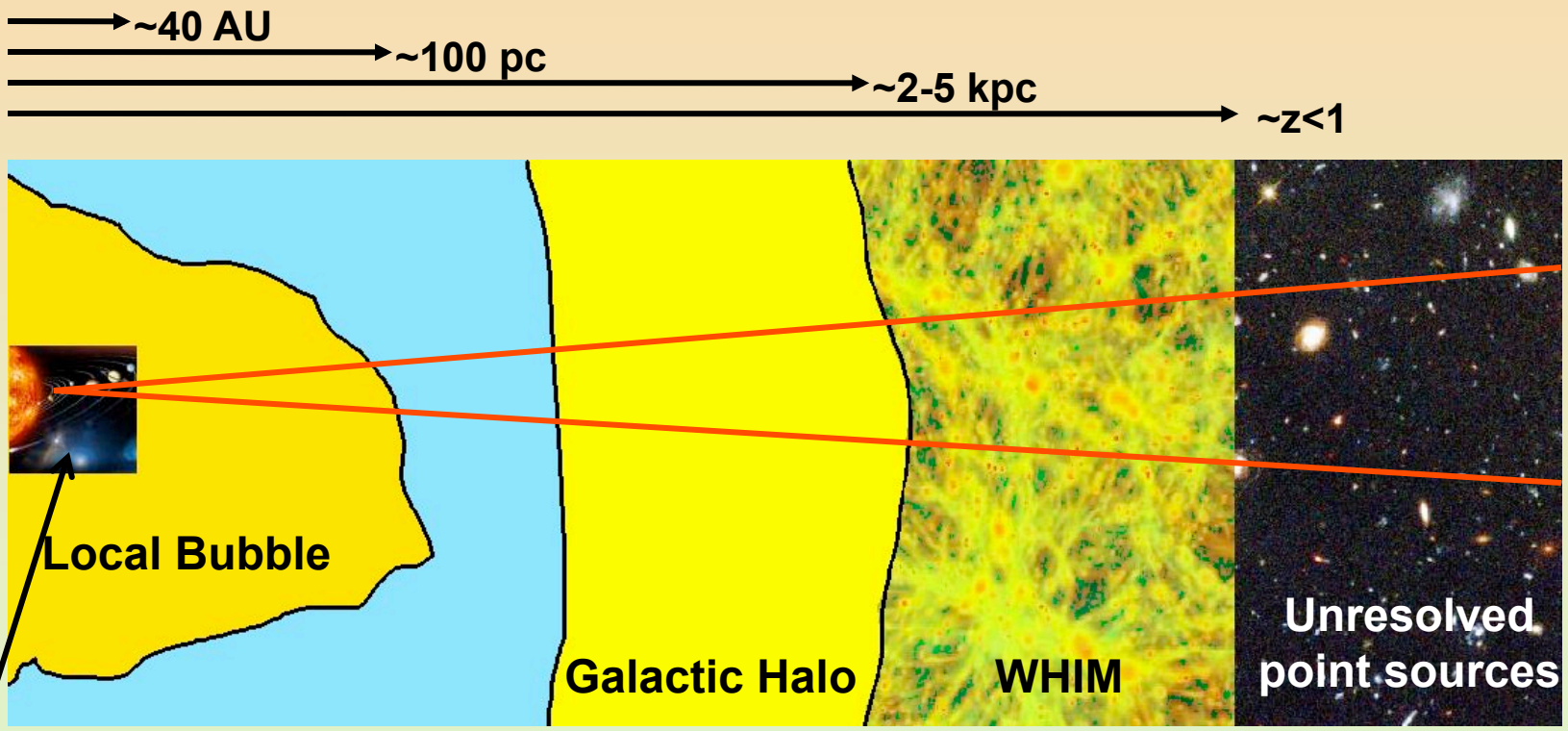
of the total diffuse X-ray emission.



Calculated AcF for the two control targets, MBM20 (squares) and the Eridanus hole (full circles), compared with the average AcF (empty circles).

Philadelphia, 22 April 2008

Conclusion

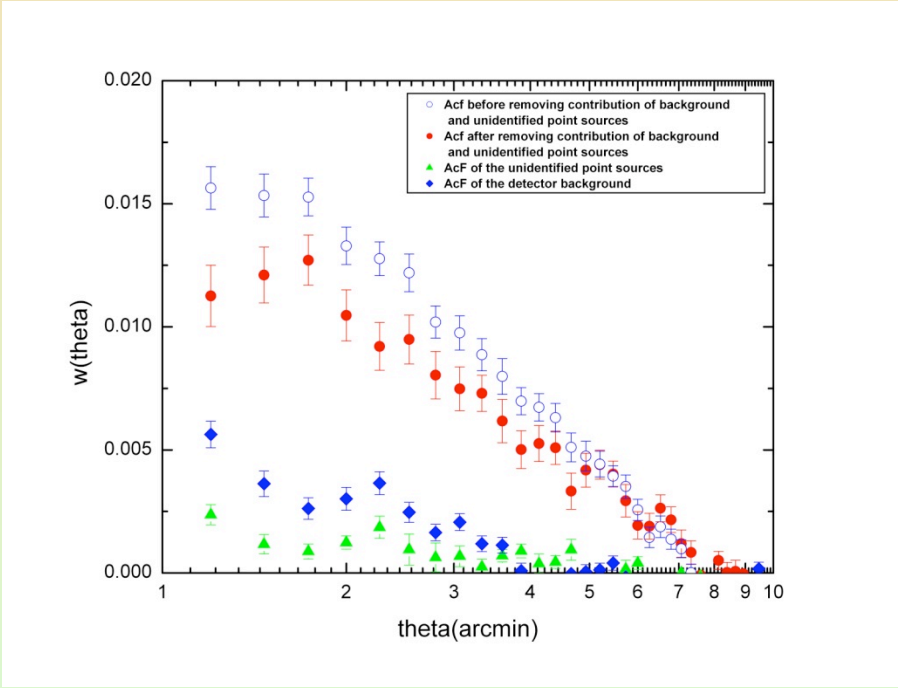


The End

Philadelphia, 22 April 2008

Angular Autocorrelation

- $n^2\, w(\Theta)=n_p^2\, w_p(\Theta)+n_b^2\, w_b(\Theta)+n_w^2\, w_w(\Theta)$



ACF of the diffuse X-ray background and its components.

Acf of Hubble Deep field North